DEPARTMENT OF NATIONAL DEFENCE
CANADA

OPERATIONAL RESEARCH DIVISION

DIRECTORATE OF OPERATIONAL RESEARCH (JOINT & LAND)

DOR(J&L) RESEARCH NOTE RN 9702

CONDUCTING A WARGAME USING THE COMPUTER ASSISTED BOARD GAME AND JANUS SIMULATIONS

by

Major L.E. Glover
(with assistance from Major L.R. Mader)

MARCH 1997

OTTAWA, CANADA

National Defence Défense nationale

OPERATIONAL RESEARCH DIVISION

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MAJOR L.E. GLOVER
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Recommended by: _____ Approved by: _____

RWGT Team Leader DOR(J&L)

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OTTAWA, CANADA MARCH 1997

ABSTRACT

This research note describes the majority of work required before and during a wargame conducted using the Computer Assisted Board Game (CABG) and/or Janus simulation. Emphasis is placed on the duties of the Controller during the conduct of a research wargame. These comments are based on the experience gained during the IRON JOUST, IRON NOBLE and BRONZE PIKE wargames.

RÉSUMÉ

Ce document explique les activités requises avant et pendant les jeux de guerre utilisant les simulations Janus et CABG. L'emphase du document porte sur les tâches du contrôleur durant un jeu de guerre de recherche. Ces activités sont une synthèse de l'expérience acquise lors des jeux de guerre IRON JOUST, IRON NOBLE et BRONZE PIKE.

TABLE OF CONTENTS

ABSTRACT ..... - i -

TABLE OF CONTENTS ..... - ii -

Controlling Wargames Using the CABG and Janus Simulations ..... - 1 -
Background ..... - 1 -
General ..... - 1 -

Some Duties And Responsibilities of Key Wargame Project Team Members A-1

Actions Prior to Commencing Wargame B-1

Controller's Actions During Wargame C-1

Actions Required to Set Up Janus Type Wargame D-1

Control of Artillery E-1

Janus AUTOJAN Procedures F-1

List of Abbreviations G-1

Controlling Wargames Using the CABG and Janus Simulations

Background

1. There is an outstanding requirement to establish guidelines to ensure consistency in how the Directorate of Operational Research (Joint and Land) (DOR(J&L)) conducts its wargames. Research Wargame Team (RWGT) guidelines have never been produced to guide the set-up, conduct and control of a research wargame.

General

2. The aim of research wargaming is to provide data and insights for analysis which will eventually provide the army with not only the best equipment, but the correct doctrine, tactics and organizations with which to complete its mission. It is not important who wins or loses any particular wargame, but by providing operational research and analysis reports to the appropriate staff, the Canadian soldier must become the ultimate winner. Therefore, wargamers must ensure that they do not compromise the data provided to an analyst by seeking to win; they must ensure that:

   a. their forces act in a doctrinally and tactically sound manner;

   b. they do not make use of artificial gaming circumstances to improve their chances of winning; and

   c. they seek to avoid learning from one iteration of a scenario to the next. Each iteration must unfold in the same manner as the others except for actions that are the result of information gained during the game.

3. The task of controlling a wargame can be broken into two distinct phases:

   a. <u>Actions Prior to the Commencement of a Wargame</u>. Although the actions themselves are clear, it is essential that a wargame Controller be appointed as soon as possible to ensure he is fully aware of the sponsor's requirements and

therefore, he can begin to coordinate effectively the actions of the wargame team.

b. Actions During Play of a Wargame. This phase is neither easy nor straightforward. The Controller must ensure that the focus is maintained by all participants on the aim of the wargame, and not on who wins or loses the game. It is essential that the Controller remains impartial. Frequently decisions must be made that may seem prejudicial to individual players. Provided the decisions are made within the wargame's established guidelines, there is no conflict.

4. This research note provides a recommended description (suggestion) of how to set-up and control a wargame.

ANNEX A
TO DOR(J&L) RN 9702
MARCH 1997

Some Duties and Responsibilities of Key Wargame Project Team Members

1. Computer Assisted Board Game (CABG) Scientist. As the scientist responsible for this simulation (Simulation Scientist):

   a. ensure the simulation is functioning properly;

   b. provide any advice necessary on the limitations and capabilities of this simulation;

   c. provide advice in terms of any force modelling; and

   d carry out any testing of the model that may be necessary.

2. Janus Scientist. As the scientist responsible for this simulation (Simulation Scientist):

   a. ensure the simulation is functioning properly;

   b. provide any advice necessary on the limitations and capabilities of this simulation;

   c. carry out any modifications of the Janus code required by the study that are within the capabilities of Janus;

   d. provide advice in terms of any force modelling; and

   e. carry out any testing of the model that may be necessary.

3. Database Manager:

a. ensure that the database contains the correct data for all systems required for the project; and

b. ensure that the required symbols and terrain files are tested and available.

4. Project Leader (Scientist) (Sci). (It is assumed this person is also the project analyst):

a. act as the Project Leader of the project;

b. write the Project Directive, including the methodology section and analysis plan, ensuring that the wargame will produce the data necessary to respond to the sponsor's questions; and

c. conduct the AUTOJAN runs as required. The scope, capabilities and procedure for AUTOJAN are described at Annex F.

5. Project Leader (Military) (Mil):

a. develop the scenarios, in conjunction with Project Leader (Sci) and sponsor, which will produce the required data;

b. modelling of forces as required;

c. provide coordination with the sponsor; and

d. provide advice to the Project Leader(Sci) for the Game Directive.

6. RED and BLUE Commanders:

a. develop and prepare plans and orders;

b. develop detailed organizations to include specific modelling requirements;

c. develop task forces and supervise/assist their input on the terminals;

d. allocate duties to their team; and

e. coordinate and direct the play of their team to ensure the aims and objectives of the study are met.

ANNEX B
TO DOR(J&L) RN 9702
MARCH 1997

Actions Prior to Commencing Wargame

1. As soon as the decision has been made that a wargame or wargames are required, a wargame Controller must be appointed. The Controller must be made aware of the sponsor's project aim, limitations/ restrictions, questions, requirements, etc. He must be included in the initial DOR(J&L)/client project definition discussions in order to be made fully aware of the scope and concept of the project.

2. In conjunction with some or all of the following, Project Leaders, Head RWGT and the CABG/Janus Simulation Scientists, the Controller will establish the game sequence in terms of scenario, iterations, order of play and a draft timetable. He also assists the Project Leaders and sponsor in the choosing of terrain and as necessary the preparation and testing of new terrain. Consideration at this time must be given to the question of boundaries for RED and BLUE. It is suggested that unless the project specifically requires them to be different, they should be the same. This will prevent the problem of the forces having to worry about what is across the boundary.

3. In conjunction with Project Leaders, CABG/Janus Simulation Scientists and Database Manager, the Controller must ensure that a database is ready and any necessary testing is completed for all simulations.

4. As required, the Controller will provide aid to the Project Leaders in the development of the analysis plan. Details are contained in Research Note 94/6(DLOR), Sep 94.

5. The Controller must approve the proposed force models produced by RED and BLUE Force Commanders. Prior to giving his endorsement, the Controller should first seek comments from the Project Leaders, RWGT OPI and CABG and Janus Simulation Scientists.

6. If it is agreed that an open-sided wargame should be conducted, the Controller, together with some or all of the following; Project Leaders, Head RWGT, CABG and Janus Simulation Scientists, and the RED and BLUE Commanders, conducts a RED/BLUE

Options Session. The feasibility of various tactics/organizations/equipment options can be tested using the CABG. This ensures that the initial RED and BLUE plans are the best options for the required analysis, prior to creating any scenario(s) with Janus. The CABG results illustrate the best RED and BLUE options which can be developed into their respective plans and orders which meet the aims of the Project Leader(Sci) and most closely match the doctrine of both sides. The Controller must remember that the RED Force is only a test vehicle from which comparative research can be obtained. Once RED and BLUE outline plans and the overall scenario(s) have been endorsed, the Controller must produce gaming intelligence which assist RED and BLUE Commanders in developing detailed estimates, plans and orders.

7. The Controller must listen to RED and BLUE orders and identify any assumptions, limitations or any other information that may affect their plans and orders. If an open game is being conducted these should be presented to Head RWGT and all players (or at a minimum the Head RWGT and the opposing force commander) to ensure that the plans will result in interactions which will generate the type of data from which the measures of effectiveness (MOEs) can be analysed. Once plans are ready and it appears that the game will produce the necessary data, the two force commanders must produce their task force lists. These lists are loaded into the model and verified by the respective commanders. At this time, the Controller must clearly define on the gaming map the starting furthest-forward locations for units. These forward locations may be subsequently amended after trial/practice play as necessary.

8. The game Controller must produce "Control Notes". These notes may have to be amended/modified as a result of board, trial or game play. These notes are a summation of the assumptions/ decisions made and how they will be implemented/represented in the wargame tool(s). They also briefly describe any special procedures initiated to deal with particular circumstances. The points which must be addressed, but not limited to, include:

a. the various parameters for each piece of equipment at game start and, if necessary, throughout the game (eg shoot, defilade status etc);

b. changes in the database that were made to ensure that the players are aware and for record keeping purposes;

c. scenario names and numbers etc;

d. general instructions for the "attacker" and "defender";

e. artillery instructions as required;

f. engineer instructions as required;

g. the keeping of event logs by the players as required;

h. the recording of judgements and insights as required;

i. record of the data contained in the terrain editor;

j. the composition of the RED and BLUE infantry sections;

k. establish what, if any, off-line rules will be used and in what manner for the game (eg artillery ammunition, availability of artillery);

l. establish what, if any, areas that are to be "NO GO" areas for tracks, wheels and foot; and

m. determine any item(s) that will make the playing of the game(s) more clear and consistent for the players and to ensure that there is a record should the game need to be played again at some future date.

9. A sample representation of Control Notes is attached as Appendix 6.

10. The Controller must establish a start-up log to record start/stop points, branch points, problem areas etc. This must be in enough detail to allow anyone in the future to read it and to be able to refer back to the gaming tapes and re-run a particular iteration (see Appendix 2).

11. The Controller must learn as much as one is able about Janus in terms of how it works for Probability of Hit (Ph), Probability of Kill (Pk), Line of Sight (LOS), terrain, direct fire etc. While some of the necessary information is contained in the Database Manager's guide, the Janus Simulation Scientist is the authority on how Janus works.

12. The Controller will forecast/establish in conjunction with the Project Leaders, where/when it is intended to create branch points (in terms of the ground or an event). This is required to enable the scenario to be broken into smaller scenarios if necessary for analysis purposes. If it is intended to use the AUTOJAN facility, branch points cannot be used. The AUTOJAN facility is described at length at Annex F; particular attention must be paid to the types of scenarios where AUTOJAN is not appropriate and to the procedures that DOR(J&L) staff have learned to ensure that AUTOJAN works properly in scenarios where it is appropriate.

13. The Controller may establish a system for recording game history as required. As a minimum this must include logs for start-up (Appendix 2); RED, BLUE, and Controller major tactical events (Appendix 3) and indirect fire for RED and BLUE (Appendix 4).

14. In conjunction with RED and BLUE commanders, the Controller must allocate player personnel to ensure balanced teams in terms of skills and knowledge.

15. Prior to commencing play, the Controller should check the positioning of units and the movement paths of RED and BLUE forces to ensure the desired interactions will take place during game play.

16. In conjunction with the Project Leaders, the Controller will determine if the study will need to make use of the AUTOJANNING capability. If required the Project Leader(Sci) should consult the procedures detailed in Annex F as early as possible.

APPENDIX 1
TO ANNEX B
TO DOR(J&L) RN 9702
MARCH 1997

Preparation For A Research Wargame

1. Prior to the tasking of the RWGT to conduct a wargame an analysis of the problem must be done by the Project Leader(Sci) to determine the best tool or tools to investigate the problem.

2. If a wargame is required, the RWGT is tasked to conduct it, in order to provide data for the Project Leader(Sci)to answer the specific question or questions. If not already appointed, a military officer should be appointed as Project Leader(Mil) at this time.

3. The following should now be known and included in a draft Game Directive:

   a. what are the questions to be answered;

   b. what interactions need to be assessed; and

   c. what information/data is required.

4. These requirements help determine/select the type of wargame tool(s) needed to provide the necessary data.

5. The Project Leader(Mil) begins to build the scenario which includes:

   a. location;

   b. time of year and day;

   c. the meteorological conditions;

   d. composition and mission of RED and BLUE Forces; and

e. the equipment characteristics, including the technological date of RED and BLUE Forces.

6. The Project Leaders, in conjunction with the CABG/Janus Simulation Scientist(s) and Controller, must determine the following:

a. the aggregation of either force; and

b. the need for off-line rules.

7. The final Game Directive should be issued at this time, as well as a draft of the report format.

8. The database must be updated and tested for any new equipment or modelling required for this wargame. A general concept of operations for RED and BLUE should be produced at this time which also includes the force lists.

9. The Controller must produce Control Notes detailing sequence, control measures, and any details to ensure the game produces the best possible data for analysis.

10. RED and BLUE Commanders must conduct an estimate, determine the tactics to be used (if appropriate) and produce a concept of operations, plans and orders.

11. Assessment and recording procedures, as well as the necessary forms, must be developed.

12. Once everything is ready, trial play must be conducted to verify the rules and the forms.

13. The RWGT is now ready for practice play followed by game play. During this period the form of the final report should be determined. Production of maps, overlays, etc, can begin at this time.

14. Analysis of results must begin as soon as they are available to ensure the data being produced is logical and is able to answer the questions posed by the project's sponsor.

15. The writing of the report should begin as early in the project as possible and completed once the analysis is completed. Generally there is a requirement to make a presentation of the project results to the sponsor prior to completion of the final report. This may also be an ongoing requirement in order to keep the sponsor in the decision process as the project reaches pre-set milestones.

APPENDIX 2
TO ANNEX B
TO DOR(J&L) RN 9702
MARCH 1997

BRONZE PIKE

Janus Start Up Log (Example)

DATE	REAL TIME	JANUS CLOCK TIME	ITERATION	SCENARIO	BRANCH POINT	COMMENTS

APPENDIX 3
TO ANNEX B
TO DOR(J&L) RN 9702
MARCH 1997

BRONZE PIKE

Blue(Red Or Control) Major Tactical Events Log (Example)

Date: Name: Position:

Scenario/ Iteration	Time	Event	Remarks

APPENDIX 4
TO ANNEX B
TO DOR(J&L) RN 9702
MARCH 1997

BRONZE PIKE BLUE(RED) INDIRECT FIRE LOG (EXAMPLE)

Date: Scenario/Iteration: Name:

Time	Unit	Side	Name	Aimpoint	Rnds	Proj	Unit	Align	Ammo Left	Par/Conv	Time Planned

Page ___ of ___

APPENDIX 5
TO ANNEX B
TO DOR(J&L) RN 9702
MARCH 1997

TASK/RESOURCE ALLOCATION WHEN DEVELOPING A PROJECT USING THE SIMULATION JANUS

TASK NAME	RESOURCES
Get aim, questions etc from sponsor	Project Ldr(Sci)(OPI),Project Ldr(Mil)(OPI),Sponsor,Controller
Development and issue of Project Directive to include analysis plan	Project Ldr(Sci)(OPI),Project Ldr(Mil)(OPI),Sponsor,Controller
Confirm terrain; edit as necessary. NO GO areas must be confirmed for movement	Controller (OPI),Project Ldr(Mil),Project Ldr(Sci),Computer Sci,Sponsor,DB Team
Set/Develop general scenario from which RED and BLUE Comd develop plans and orders	Project Ldr(Mil)(OPI),Sponsor,Controller
Identify any additions/changes to data base	Project Ldr(Sci)(OPI),Project Ldr(Mil)(OPI),Computer Sci,R Comd,B Comd,Controller,DB Team
Briefing of RED/BLUE plans/discuss options to ensure that required data produced	Project Ldr(Mil)(OPI),R Comd,B Comd,Controller,Players,Project Ldr(Sci),Sponsor
Confirm orbats and equipment for RED and BLUE to include POL and ammo resupply	Project Ldr(Mil)(OPI),R Comd,B Comd,Controller,Sponsor
Verify all aspects of the data base and amend as required	DB Team (OPI),Project Ldr(Mil),Project Ldr(Sci),Controller,Computer Sci
Verify PH/PK data and amend as required	Computer Sci (OPI),DB Team,Project Ldr(Mil),Project Ldr(Sci),Controller
Verify priority tables for all RED and BLUE systems and amend as required	Controller (OPI),Project Ldr(Mil),Project Ldr(Sci),R Comd,B Comd,Sponsor,Computer Sci
Edit the symbol file as required	DB Team (OPI),Controller,Project Ldr(Sci),R Comd,B Comd,Project Ldr(Mil)
Conduct any testing that may be necessary; DB version note to be produced	DB Team (OPI),Project Ldr(Sci),Project Ldr(Mil),Computer Sci,Controller
Produce Controller Notes	Controller (OPI),R Comd,B Comd,Project Ldr(Mil),Project Ldr(Sci)
RED/BLUE commanders issue orders to players	R Comd (OPI),B Comd (OPI),Project Ldr(Sci),Project Ldr(Mil),Players,Controller,Sponsor
Develop and enter RED and BLUE task forces. This includes aggregation of units	R Comd (OPI),B Comd (OPI),Players,Controller
Carry out initial positioning, movement paths, shoot/defilade status, mounting, etc	Players (OPI),R Comd,B Comd,Controller,Project Ldr(Mil),Project Ldr(Sci)
Develop comd and control overlays and enter (includes engr plan)	Controller (OPI),R Comd,B Comd,Players,Project Ldr(Mil)
Confirm the JANUS start up simulation parameters	Computer Sci (OPI),Controller,Project Ldr(Mil),Project Ldr(Sci)
Conduct trial play to confirm system is operating correctly	Controller (OPI),Players,Project Ldr(Mil),Project Ldr(Sci),Computer Sci
Conduct interactive play	Controller (OPI),Players,Project Ldr(Mil),Project Ldr(Sci),Computer Sci
Autojan as required/Perform analysis	Project Ldr(Sci)(OPI),Project Ldr(Mil),Controller
Report Production	Project Ldr(Sci)(OPI),Project Ldr(Mil)(OPI),Typist,Graphic Artist

APPENDIX 6
TO ANNEX B
TO DOR(J&L) RN 9702
MARCH 1997

BRONZE PIKE
CONTROL NOTE ONE (Example)

29 October 1996

1. Prior to the BRONZE PIKE game play the JANUS database was reviewed in detail, updated and corrected wherever necessary. The necessary computer entries have been made as of this date.

2. BRONZE PIKE uses the UNIX, JANUS version 6.0 software, database version 2.0. BRONZE PIKE will be played as if it will be AUTOJANNED at a later date. This means the players will only be able to use the mouse during the game.

3. The following Scenarios were allotted to the BRONZE PIKE series:

	Scenario	RED Davison	BLUE Wilkinson	PLAY CYCLOPS Glover	PLAY FUTURE Glover
a.	Screen	101	102/112	100	110
b.	Sector Recce	121	122/132	120	130
c.	Rear Area Security	141	142/152	140	150

A unique run number will be recorded for each iteration of each scenario and will be numbered 1, 2, 3 etc.

4. JANUS(A) Simulation Cycle Variables. The following values will be set for Screen Scenarios 100, 101, 102, 110, and 112:

a. J Screen 1;

Janus Screen I

Terrain File Number.....505
Map File Number.....505
HE Dust (0=No, 1=Yes).....001
Target List Cycle(sec)....020
Graphics Update Interval..001
Random Number Seed.....002

Scenario Number.....100
Symbols File Number.....007
Defilade Time(min).....0.5
Detection Cycle(sec).....005
Time of Day(24-hr).....0600

0 = Default, 1 = Specified: _____, 2 = Random

b. J Screen 2;

Janus Screen II

WS Number	Side	Group	Symbol Size	Graph Tablets	WS Number	Side	Group	Symbol Size	Graph Tablets
4	1	1	4	1	1	7	1	4	1
2	3	3	4	1					
3	1	4	4	1	8	2	1	4	1
5	3	1	4	1	9	2	2	4	1
6	3	2	4	1					

c. J Screen 3;

Janus Screen III						
	Side					
Engineer Barriers	1	2	3	4	5	6
Ditches	35					
Abatis	1					
Craters	4					
Mine-1's						
Mine-2's	35					
Smk Pot Clusters						
Natural						
Smoke Types (1=HC, 2=WP, 3=BS, 4=FO)						
Smoke Pots	1	1	1			
VEES	4	4	4			
Grenades	2	2	2			

d. J Screen 4;

Janus Screen IV						
	Side					
	1	2	3	4	5	6
Group Speed (km/hr)	50	50	50			
Fratricide (0=N, 1=Y)						
Firing Data (1=Aimpt, 2=Recog, 3=Ident)	2	2	2			

SUPPRESSION DATA			
		Suppression Times(sec)	
Direct Fire Prob Coefficient	1.000	Direct Fire, Soldier	12
Arty Lethal Radius Factor	5.000	Direct Fire, Other	3
Arty PK Threshold	0.001	Arty(Indirect Fire)	30

e. J Screen 5;

Janus Screen V

	Target Side					
	1	2	3	4	5	6
Firing Side						
1		1				
2	1		1			
3		1				
4						
5						
6						

0 = Not Enemy

1 = Enemy (Units of firing side will fire at units of target side)

5. JANUS(A) Simulation Cycle Variables. The following values will be set for Sector Recce Scenarios 120, 121, 122, 130, and 132:

a. J Screen 1;

Janus Screen I

Terrain File Number... 505	Scenario Number.....120
Map File Number.....505	Symbols File Number.....007
HE Dust (0=No, 1=Yes)....001	Defilade Time(min).....0.5
Target List Cycle(sec)...020	Detection Cycle(sec).....005
Graphics Update Interval.001	Time of Day(24-hr).....0600
Random Number Seed.....002	

0 = Default, 1 = Specified: _____, 2 = Random

b. J Screen 2;

Janus Screen II

WS Number	Side	Group	Symbol Size	Graph Tablets	WS Number	Side	Group	Symbol Size	Graph Tablets
4	1	1	4	1	1	7	1	4	1
2	3	3	4	1					
3	1	4	4	1	8	2	1	4	1
5	3	1	4	1	9	2	2	4	1
6	3	2	4	1					

c. J Screen 3;

Janus Screen III

	Side					
Engineer Barriers	1	2	3	4	5	6
Ditches						
Abatis						
Craters		7				
Mine-1's						
Mine-2's		17				
Smk Pot Clusters						
Natural						
Smoke Types (1=HC, 2=WP, 3=BS, 4=FO)						
Smoke Pots	1	1	1			
VEES	4	4	4			
Grenades	2	2	2			

d. J Screen 4;

Janus Screen IV

	Side					
	1	2	3	4	5	6
Group Speed (km/hr)	50	50	50			
Fratricide (0=N, 1=Y)						
Firing Data (1=Aimpt, 2=Recog, 3=Ident)	2	2	2			

SUPPRESSION DATA

			Suppression Times(sec)
Direct Fire Prob Coefficient	1.000	Direct Fire, Soldier	12
Arty Lethal Radius Factor	5.000	Direct Fire, Other	3
Arty PK Threshold	0.001	Arty(Indirect Fire)	30

e. J Screen 5;

Janus Screen V

	Target Side					
	1	2	3	4	5	6
Firing Side						
1		1				
2	1		1			
3		1				
4						
5						
6						

0 = Not Enemy

1 = Enemy (Units of firing side will fire at units of target side)

6. JANUS(A) Simulation Cycle Variables. The following values will be set for Rear Area Security Scenarios 140, 141, 142, 150, and 152:

a. J Screen 1;

Janus Screen I

Terrain File Number... 506
Map File Number.....506
HE Dust (0=No, 1=Yes)....001
Target List Cycle(sec)...020
Graphics Update Interval.001
Random Number Seed.....002

Scenario Number.....100
Symbols File Number.....007
Defilade Time(min).....0.5
Detection Cycle(sec).....005
Time of Day(24-hr).....0545

0 = Default, 1 = Specified: _____, 2 = Random

b. J Screen 2;

Janus Screen II

WS Number	Side	Group	Symbol Size	Graph Tablets	WS Number	Side	Group	Symbol Size	Graph Tablets
4	1	1	4	1	1	7	1	4	1
2	3	3	4	1					
3	1	4	4	1	8	2	1	4	1
5	3	1	4	1	9	2	2	4	1
6	3	2	4	1					

c. J Screen 3;

Janus Screen III						
	Side					
Engineer Barriers	1	2	3	4	5	6
Ditches						
Abatis						
Craters						
Mine-1's						
Mine-2's						
Smk Pot Clusters						
Natural						
Smoke Types (1=HC, 2=WP, 3=BS, 4=FO)						
Smoke Pots	1	1	1			
VEES	4	4	4			
Grenades	2	2	2			

d. J Screen 4;

Janus Screen IV						
	Side					
	1	2	3	4	5	6
Group Speed (km/hr)	50	50	50			
Fratricide (0=N, 1=Y)						
Firing Data (1=Aimpt, 2=Recog, 3=Ident)	3	2	3			

SUPPRESSION DATA			
		Suppression Times(sec)	
Direct Fire Prob Coefficient	1.000	Direct Fire, Soldier	12
Arty Lethal Radius Factor	5.000	Direct Fire, Other	3
Arty PK Threshold	0.001	Arty(Indirect Fire)	30

e. J Screen 5;

Janus Screen V

Firing Side	Target Side 1	2	3	4	5	6
1		1				
2	1		1			
3		1				
4						
5						
6						

0 = Not Enemy

1 = Enemy (Units of firing side will fire at units of target side)

7. Generai Instructions and Hints for the "Attacker"

a. SHOOT/NO SHOOT. All units capable of shooting should be in SHOOT but this is up to the Commander.

b. LOS

(1) All static units that will be involved in the direct fire battle will have their LOS fans set for their anticipated engagement/observation arcs. Units which may change location during the battle should set their LOS as wide as possible to cater for the need to autojan.

(2) All dismounted units which initially were mounted and as a result of game play were dismounted for infantry tasks should have their LOS fans set to 180 degrees after dismounting.

8. General Instructions and Hints for the "Defender"

a. Defilade

(1) A unit placed in a prepos begins to go through the pop-up cycle once an enemy unit is detected and meets the opening fire criteria. The unit cannot be placed in any other defilade status. For the initial deployment, generally all AFVs will be in prepos or in hides;

(2) Recce vehicles will be placed in full defilade when in OP/Surv positions; and

(3) Tanks, ATGMs and ACVs will be placed in prepos or may be in hides with routes planned for the move forward to a prepos. NAPCs which have been deployed forward of hides on the battle position will be in prepos as well.

b. LOS. Normally, systems which are in prepared defensive positions will set their LOS fans at no more than 180 degrees. There will be exceptions to this as in the case for autojaning and these situations will be discussed with the Controller before play commences.

9. Artillery. The following conventions/procedures will be used during BRONZE PIKE:

a. CB will not be played;

b. ICM ammunition will be played;

c. Converged gun/mortar shoots will be the EXCEPTION rather than the rule. Players will request approval to fire a converged shoot from the Controller;

d. Scatterable mines will not be used by either side;

e. Response time and re-load time for indirect fire systems have been reviewed and if necessary amended. These timings are summarized below. It should be noted that re-load time, which can also be expressed as time between rounds, is generally based on published sustained rates of fire. Rates published in different references may vary and may not necessarily agree with these rates which are out of necessity a compromise due to the limitations of the JANUS simulation;

Side 1: BLUE

System	Set-up Time (sec)	Response Time (Sec)	Re-load Time (Sec)	Tear down Time (sec)
60mm Mor	30	30	10	10
81mm Mor	165	90	12	90
M109A4	330	90	60	180
LEOPARD/AC	0	5	5	0

Side 2: RED

System	Set-up Time (sec)	Response Time (Sec)	Re-load Time (Sec)	Tear down Time (sec)
120mm Mor	195	90	15	90
2S1	285	90	30	180
2S3	330	90	60	180
2A36	360	90	60	180
BM 21	420	180	1200	180
T-72Z	0	5	6	0

f. BLUE artillery basic loads were changed to that which can be carried within the Op SABRE brigade organization;

	HE	HC	WP	ICM
60mm(12)	20		40	
81mm(8)	336		28	
M109A4	130	43		40
LEO/ACV	18		3	

g. RED artillery basic loads reflect what would be carried on wheels within the Regiment/Brigade. Instructions on the allocation and use of the following basic load is given in the RED Commander's orders;

	HE	ICM	WP SMK	HEAT
M-120 Mor	208		51	
2S1	165		40	8
2S3	75	35	52	11
2A36	75	35	52	11
BM 21	3(120)			
T-72Z	21			

h. Artillery and mortar units are to be deployed in as tactical a location as possible in terms of distance from the FEBA or intended location of action.

10. Negotiating Obstacles

a. In the JANUS(A) simulation, systems encountering obstacles , either man-made or natural, react according to their defined capabilities. Systems encountering an obstacle within their capability to clear are halted for the delay time required to clear or cross the obstacle as defined in the database. Movement orders for a unit which is clearing or crossing an obstacle remain unchanged.

b. Systems encountering obstacles not able to clear or cross them will have their movement stopped by the simulation. The unit will remain where the obstacle was encountered. This allows the unit's movement orders to be easily changed/modified after consultation with the controller, and at the same time it provides graphic evidence of the unit's inability to negotiate the obstacle.

11. Minefield Clearance. There is no need for any control measures as the simulation deals with this problem in accordance with the defined parameters in the database.

12. Event Logs. In order to maintain consistency between iterations the keeping of logs, as detailed as possible, by each commander, is mandatory. Each side as well as the controller must work out a system to maintain this log to facilitate as accurate a replication of game iterations as possible (simulation events/interactions may force either side to make different decisions in each iteration). Once a game has commenced substitute players should only be used in the case of an emergency to ensure accurate replication. Logs should include timings, events, action taken and if necessary location in terms of either an identifiable feature on the screen or a grid reference.

13. Judgments and Insights. These are one of the MOEs, thus all players must be aware to record any significant event and make the Controller aware of any action that could have bearing on this MOE. Some of the events that may be of significance are;

a. Limitations of manoeuvre for COYOTE, NAPC, TUA or ACV;

b. Command and control issues;

c. Firepower limitations;

d. Organizational suitability for tasks;

e. Use and need for smoke; and

f. Need for indirect fire.

14. Terrain Editor.

a. The terrain editor feature reflects the following for trees in mixed terrain:

Descriptor	PLOS Exists at 25 Meters	Height of Trees(m)	Speed Degraded To %		
			Wheel	Track	Foot
Shrub	95	3	40	80	90
Bush	80	7	35	70	90
New Trees	80	8	5	15	90
Old Trees	70	9	5	15	90
Forest	50	10	5	15	90
Coniferous	60	11	5	15	90
Deciduous	40	12	5	15	90

b. The terrain editor feature reflects the following road types in mixed terrain:

Road Types	Road Class	Width (m)	Speed Degraded To %		
			Wheel	Track	Foot
Multi-Lane	1	24	100	100	100
AW Two Lane	1	15	100	100	100
AW Paved	1	10	100	100	100
AW Loose Surface	2	8	90	50	100
Dry Weather Loose	2	8	90	50	100
Vehicle Track	2	3	45	50	100
Trail	2	1.5	5	15	100

c. The terrain editor feature reflects the following river types in mixed terrain:

River Types	River Class	Width (m)	Crossing Times (min)			
			Wheels	Tracks	Foot	Swim
Lake	3	Hard Wired	999	999	999	30
River Wide	1	30	999	999	999	20
Stream	2	10	3	2	1	2
Creek	2	5	1	1	1	1
Ford	2	5	1	1	1	1

d. The terrain editor feature reflects the following (the building types in mixed terrain:

Building Types	Building Height(m)	% Open	Number of Rooms	Number of Floors
1	5	20	8	1
2	15	15	40	4

e. The terrain parameters function has the following factors for off road speed:

Wheeled	Tracked	Foot
45	75	95

15. The terrain editor allows the controller to make specific areas impassable to tracks, wheels, foot or any combination.

16. BLUE observers have NODLR.

17. When any unit is moving its LOS is automatically set at 180 degrees.

18. When units are dismounted their LOS is the same as it was before mounting and should be checked to see that orientation and fan arc is appropriate for the task at hand.

19. Once a position/area has been cleared by the appropriate sized force, any riflemen within the area that has not been killed or detected etc. will be put into "no shoot" when advised by the controller. This will apply to both sides as required.

20. The controller in with cooperation with RED and BLUE Commanders, will provide as necessary, more detail on the effects of direct/indirect fire engagements on vehicles.

21. The BLUE infantry is modeled, if required, as follows for the defence:

Section	No	Pers	Platoon	No	Pers	Company	No	Pers
NAPC Crew	1	3	NAPC Crew	1	3	NAPC Crew	3	7
C9 TM	2	2	C6 TM	1	1	C6 TM	1	1
ERYX TM	1	2	ERYX TM	1	2	ERYX TM	1	2
			60mm Mor	1	1	60mm Mor	1	1
			INFNTEER	3	3	COYOTE	1	4
			Total pers		10		7	15

22. The BLUE infantry is modeled, if required, as follows for the offence:

Section	No	Pers	Platoon	No	Pers	Company	No	Pers
NAPC Crew	1	3	NAPC Crew	1	3	NAPC Crew	3	9
C9 TM	2	2	C6 TM	1	1	C6 TM	1	1
ERYX TM	1	2	ERYX TM	1	2	60mm Mor	1	1
INFNTEER	3	3	60mm Mor	1	1	COYOTE	1	4
Total pers		10			7			15

23. The RED infantry is modeled, if required, as follows for the defence:

Section	No	Pers	Platoon	No	Pers
Sect Ldr	1	1	Pl Comd Gp	1	2
Rifleman	1	2	Sniper	1	1
RPK TM	1	2	A/Pl Comd	1	1
RPG-16 TM	1	2	(Rifleman)		
Total pers		7			4

Note: The above are dismounted personnel only. The rifle section also includes a vehicle, with a driver and a gunner who remain with the vehicle and are accounted for as the crew of BMP or BTR systems.

24. The RED infantry is modeled, if required, as follows for the offence:

Section	No	Pers	Platoon	No	Pers
Rifleman	1	3	Pl Comd Gp	1	2
RPK TM	1	2	Sniper	1	1
RPG-16 TM	1	2	A/Pl Comd	1	1
Total pers		7			4

Note: The above are dismounted personnel only. The rifle section also includes a vehicle, with a driver and a gunner who remain with the vehicle and are accounted for as the crew of BMP or BTR systems.

25. Before mounting any system inside a trench ensure it is in shoot and partial defilade. If this is not done the mounted system does not take on the characteristics of the trench when it is put in shoot and/or partial defilade.

26. The only prepos to be used are those for vehicles.

27. ACV, LEOPARD and T 72 were placed in the indirect fire systems portion of the 400 available systems in the JANUS(A) database. This was done to represent the area effects of HE speculative direct fire and direct fire smoke.

28. For the purpose of conducting Ex BRONZE PIKE in Janus 6.0 the following vehicles will be modelled as follows:

a. Command version of Coyote
- 1 X System 178 (C-COYOTE)
- 1X System 203 (ArRECTpr) not aggregated
- 5 X System 210 (AT Mine);

b. Tripod version of Coyote
- 1 X System 247 (T-COYOTE)
- 1 X System 166 (RDR-TPD)
- 1X System 203 (ArRECTpr) not aggregated
- 5 X System 210 (AT Mine);

c. Mast version of Coyote
- 1 X System 135 (M-COYOTE)
- 1 X System 165 (MASTPAC)
- 1X System 203 (ArRECTpr) not aggregated
- 5 X System 210 (AT Mine);

d. Support section
- 1 X System 253 (ELAV)
- 1 X System 207 (ERYX TM)
- 1X System 213 (OBSN DET)
- 5 X System 210 (AT Mine);

e. Blue FOO Vehicle
- 1 X System 134 (NAPC)
- 1 X System 186 (ARTYTECH)

		- 1X System 187 (ARTYFOO);
f.	Blue scout car	- 1 X System 183 (SCT CAR) - 1 X System 203 (ArRECTpr) not aggregated - 5 X System 210 (AT Mine);
g.	Blue ACV with recce sqn	- 1 X System 50 (ACV) - 5 X System 210 (AT Mine);
h.	Blue TUA with recce sqn	- 1 X System 138 (TUA(CA)) - 5 X System 210 (AT Mine);
i.	Red radar vehicle	- 1 X System 364 (BMP-RDR) - 1 X System 306 (RDRMASTR) - up to two pers who can dismount;
j.	Blue recce det	- 1 X System 192 (RECCE DT) aggregated twice;
k.	Blue platoon HQ	- 1 X System 197 (PL HQ) aggregated twice;
l.	Blue company HQ	- 1 X System 198 COY HQ) aggregated three times;
m.	Blue bn command team	- 1 X System 199 (BN COMD) aggregated three times;
n.	Blue command post team	- 1 X System 200 (BN CP TM) aggregated three times;
o.	Red battalion HQ	- 1 X System 326 (R BN HQ) aggregated twice;

p.	Red recce team	- 1 X System 327 (R REC TM) aggregated twice;
q.	Red company HQ	- 1 X System 330 (R COY HQ) aggregated twice;
r.	Red platoon HQ	- 1 X System 331 (R PL HQ) aggregated twice; and
s.	Red infantry section	- 1 X System 337 (R INFSEC) aggregated as required.

29. The modeling of RED and BLUE systems in terms of what part of the force is modeled and what amount of aggregation is applied, is reflected in the force printouts for each scenario. In general terms those BLUE systems which are key to the project (COYOTE) and major direct fire systems (TUA, ACV, and LEOPARD) are modeled as single systems.

30. Recce vehicles that have a tripod as part of their equipment can move for real and in the simulation without mounting the tripod. The simulation, however allows the tripod to continue to furnish detections to the vehicle which does not happen. Therefore players if moving the COYOTE without mounting the tripod must close the view fan to zero and turn it away from the enemy.

31. FOO/MFC vehicles (RED and BLUE) should generally be placed in NO SHOOT as their primary mission is to provide indirect fire. They should be permitted to fire in self defence once approved by the controller.

32. The terrain editor feature reflects the following area types in mixed terrain:

Area Type	Height(m)	PLOS Exits at 25 m	Speed Factors % Wheels	Tracks	Foot
1. Hill Slope Wood	10	50			80
2. Hill Slope Open					90

33. In order to attempt to maintain distances and speeds between the various vehicles the following table reflects BRONZE PIKE vehicle speeds:

BLUE				RED			
VEHICLE	CLASS	RD SPEED	X-COUNTRY	VEHICLE	CLASS	RD SPEED	X COUI
ACV	TRK	80	60	T-72 Z W/ERA	TRK	72	54
LEOPARD 1Z	TRK	80	60	T-72/PL	TRK	66	49.5
LEOP/PL	TRK	68	51	T-72/RL	TRK	66	49.5
LEOP/RL	TRK	68	51	BMPrecce	TRK	78	58.5
BISON	WHD	100	45	BMP 1 AD	TRK	78	58.5
NAPC	TRK	80	60	ACRV	TRK	74	55.5
M-COYOTE	TRK	96	72	MT-LB	TRK	74	55.5
TUA(CA)	TRK	77	57.75	BMP 2	TRK	78	58.5
M548	TRK	60	45	BTR 70	WHD	80	36
ELAV	TRK	96	72	BRDM 2	WHD	100	45
ADATS	TRK	70	52.5	BRDM-SPA	WHD	100	45
LEOP 1 DZ	TRK	80	60	BRDM RKH	WHD	100	45
BISON MOR	WHD	100	45	BMP RDR	TRK	78	58.5
T-COYOTE	TRK	96	72	BM 21	WHD	75	33.7
C-COYOTE	TRK	96	72	2S6	TRK	65	29.2
NAPC PL	TRK	80	60	SA-6	WHD	44	19.8
NAPC CC	TRK	80	60	SA-13	TRK	74	33.3

Notes: 1. X-Country speed is based on 75% road speed for tracks and 45% for wheels.

2. In order to attempt to have some reasonable tactical movement the cross country speeds were adjusted to that of the slowest vehicle that would travel in the formation.

ANNEX C
TO DOR(J&L) RN 9702
MARCH 1997

Controller's Actions During Wargame

1. The Controller must maintain impartiality during the wargame. He is the referee or arbitrator in all situations. The focus of the players must be maintained to achieve the aim of the game/project - it doesn't matter who wins or loses.

2. He must not make arbitrary decisions; but use all the rules and assessment procedures available. The most often used are the demolition routine found in the CABG and the artillery availability rule as defined in Annex E. At the very least random numbers and basic probabilities should be used to make decisions in the absence of rules.

3. As much as is possible the Controller must ensure RED and BLUE conduct the playing of the wargame in accordance with the Commanders' plans. Changes must be allowed when the opposing force's actions indicate a change in plan is necessary.

4. During subsequent iterations of the same scenario, the Controller must ensure as far as possible, that RED and BLUE conduct the playing as in the first iteration of the series unless the simulation, through changing events, indicates a change is necessary. This applies to all player actions including artillery aim points, type and quantity of ammunition and distribution of fire. Players must still react to what their individual screens show them and not to what they remember or think they remember from previous iterations. Players must not be allowed to anticipate or plan actions based on knowledge from previous iterations of the same scenario. To help in this situation a randomization of the sequence of game play is advised if at all possible.

5. The Controller will ensure the branch points, if required, are created at the appropriate points to ensure that a new game or iteration can be started if it is deemed necessary.

6. The Controller will ensure that time is allowed to record the events in order that the game history can be compiled as required. At the same time players should be encouraged

to record any judgements and insights to ensure they are not forgotten. This may entail having to stop/slow down play periodically for players to carry out these actions.

7. All RWGT personnel must record any known or suspected software/database problems as they occur. The Controller must pass them to the CABG/Janus Simulation Scientist as soon as possible in order that appropriate action is taken while events are still fresh in everyone's mind. If there is a problem it could affect the project.

ANNEX D
TO DOR(J&L) RN 9702
MARCH 1997

Actions Required to Set Up Janus Type Wargame

1. The Project Leader(Mil) sets/develops the general scenario from which RED and BLUE Commanders develop their plans and orders.

2. The Project Leader(Mil), Controller and Commanders must confirm Orders Of Battle (ORBAT) and equipment for RED and BLUE down to section level, to include petroleum, oil and lubricant (POL) and ammunition resupply.

3. The Controller confirms the terrain to be used with the Project Leaders and edits/has edited as necessary the roads, rivers, towns, and woods. At this time NO GO areas must be confirmed for tracks, wheels and/or foot movement.

4. The Controller must ensure that the symbol file(s) are created/edited as required.

5. The Controller produces the appropriate Control Notes.

6. The Controller in conjunction with the Project Leaders ensures the engineer plan - minefields, ditches, craters etc, is completed, resource availability confirmed and if necessary deployed by the RWGT engineer.

7. The RED and BLUE Commanders develop and enter RED and BLUE task forces. This includes deciding in conjunction with the Project Leaders what the aggregation of units is to be. It also includes the level of resupply units for POL and ammunition required to support the game. The Controller sets up separate scenarios for RED and BLUE to allow them to deploy and practise independently of each other. When both sides are happy the Controller merges the scenarios. (Merge cannot be done unless all scenarios are in the same user account). See Appendix 2 to Annex F and follow steps as outlined on screen after entering MS.

8. The opposing forces carry out initial planning on the work stations, which includes unit positioning, movement paths, shoot status, defilade status, mounting/dismounting, pop-up etc.

9. The Project Leaders, Controller, Database Manager and the Commanders verify the database for all RED and BLUE systems and amend as required.

10. The Project Leaders, Controller, Database Manager and Janus Simulation Scientist verify Ph/Pk data and amend as required.

11. The Project Leaders, Controller, Database Manager and the Commanders verify weapon selections and target priorities for all RED and BLUE systems and amend as required.

12. The Project Leaders, Controller, Database Manager and the Commanders conduct any testing that may be necessary.

13. The Controller and the Commanders develop command and control overlays and enter them into the command (CAC) files (may include the engineer plan).

14. The Controller confirms the Janus start up simulation parameters.

15. The Controller and Database Manager conduct trial play to confirm system is operating correctly.

16. The Controller sets up a control (start up) log to record usage of Janus for the project (Appendix 2 to Annex B).

ANNEX E
TO DOR(J&L) RN 9702
MARCH 1997

Control of Artillery

1. The use of artillery during research wargames, that are not looking at artillery doctrine and tactics operational research questions, must be controlled to ensure that its employment is in accordance with current doctrine and is reasonably consistent from iteration to iteration and game to game. This is an off-line rule and Commanders must ask the Controller for use of indirect fire resources. In order not to prejudice the collection of the necessary data, there will be times and occasions when the Controller will have to severely restrict the use of indirect fire, although the tactical picture presented to RED or BLUE would indicate that all available resources should be firing. Further there are times, when, due to the limited RWGT resources, lucrative targets are presented to indirect fire resources but the tactical situation would indicate that the target would not be there in a real battle(eg. too many icons on one player station and while the player is moving/watching another part of the battle, a group of icons stops and becomes a target, when in reality it would have kept moving). The use of indirect fire must not prejudice the capture of the required data for analysis.

2. The control of RED and BLUE artillery is paramount, and must be conducted in a realistic, unbiased and fair manner. To that end the following guidelines are provided:

a. BLUE. For the offence and defence artillery should be allocated to the operation using approved command and control terminology with a specified allotment of ammunition;

b. RED (for a Soviet patterned enemy). For the offence and defence artillery should be allocated to the operation in terms of units/sub-units with a specified allotment of ammunition;

c. RED and BLUE artillery players must keep a running total of ammunition usage. When their allotment has been expended they must ask the Controller for authority to fire from the Commander's reserve; and

d. the following availability table applies to both RED and BLUE;

Allocated Artillery	Bde/Regt Defence 2 Battle Gps Up	Bde/Regt Offence 1 Battle Gp Fwd	Bde/Regt Offence 2 Battle Gps Fwd
Battle Gp DS Bty	1-100	1-100	1-100
Remainder Bn/Regt Arty(1)	1-50	1-90	1-50
Reinforcing Artillery to Bde/Regt (2)	1-50	1-100	1-50
GSR Artillery to Bde/Regt (2)	1-40	1-80	1-40
GS Artillery to Bde/Regt (2)	1-30	1-60	1-30

Notes: 1. Allocated and fired as btys for BLUE; bns for RED.

2. Allocated and fire as regts (bns).

3. Use of rockets should include an allotment of volleys and target restrictions.

4. Units could be attached at a higher priority for a period of time coupled with an allotment of ammunition. This is normally done for a specific operation, ie. an attack.

5. The numbers in the above table refer to the probability of the allocated artillery being available if requested.

Ammunition Norms (Rds) to be Fired To Neutralize Targets

TARGET	RED					BLUE			
	120 Mor	122mm	152mm	BM21	BM22	81mm Mor HE	105mm HE	155mm HE/ICM	MLRS ICM
Battery of guns/mortars	450	450	270	400	240	0	200	126/18	1
Battery towed guns/ mortars dug-in	240	240	180	320	180	0	200	126/18	1
Battery towed guns/ mortars in open	90	90	60	120	60	0	200	126/18	1
Dug-in troops/ weapons in prepared positions (1)	200	200	150	240	100	0	0	90/36	1(5)
Dug-in troops /weapons in hasty defence(1)	140	150	110	180	80	200	200	90/36	1(5)
Troops/ weapons in open (1)	10	20	15	8	5	200	200	90/36	1(5)
CP - dug-in (1)	200	200	150	240	100	0	200	90/36	1(6)
CP - in open (1)	25	50	40	20	15	200	200	90/36	1(6)
ATGM/Anti-tank gun or individual target in open	140	140	100	0	0	0	0	0	0

Notes: 1. Suppression of 1 hectare of target area.

2. Assume BLUE and RED occupies area 500 X 500 metres(25 hectares).

3. Numbers are total rounds, MLRS (12 rockets) is in launchers.

4. RED data is from TRADOC 350-16 dated 15 Sep 94 - Heavy Opposing Force Tactics Handbook.

5. Per company position.

6. Per CP position.

7. BLUE data is from weapons effects tables from Field Artillery School.

8. This ammunition is for targets which are not observed. If targets are observed the ammunition can be reduced by 25%.

APPENDIX 1
TO ANNEX E
TO DOR(J&L) RN 9702
MARCH 1997

Notes For Blue Artillery

1. For smoke missions - plan one volley per minute of smoke required for M109A4 units, and
- plan three volleys per minute of smoke required for 81mm mortar units.

2. As a general rule do not fire artillery or mortars at targets of less than platoon strength or if target is moving.

3. Normally a minimum of three fire units should be used. A fire unit is considered to be a battery of guns or platoon of mortars. Mortars are best suited for fire against soft skinned targets.

4. ICM should only be fired at stationary hard targets such as bunkers, APCs, tanks, detected by FOO/MFCs. The Controller must authorize players to fire ICM at any target.

5. If the target is not seen by a FOO/MFC, then a delay of five minutes should be imposed on the sending/firing of the indirect fire mission.

APPENDIX 2
TO ANNEX E
TO DOR(J&L) RN 9702
MARCH 1997

Notes For Red Artillery

1. RED Divisional Recce does not use artillery fire due to the time and distance separation from the main body.

2. RED Regimental Recce can call for indirect fire, subject to the Commander's decision, but it cannot be adjusted by recce forces.

3. Normally a minimum of a battalion should be fired at a target. Artillery fire is in accordance with target priorities determined by the RED Commander prior to game start. As a guide the following is presented:

   a. tank formations;

   b. prepared positions;

   c. command elements; and

   d. guns/mortars.

4. For smoke missions
   - plan one volley per minute of smoke required for 152mm units;
   - plan two volleys per minute of smoke required for 122mm units;
   - plan three volleys per minute of smoke required for 82mm mortar units; and
   - plan two volleys per minute of smoke required for 120mm mortar units.

5. ICM should only be fired at stationary hard targets such as bunkers, APCs, tanks, detected by FOO/MFCs. The Controller must authorize players to fire ICM at any target.

6. The response times to determine when fire directed at detected units can be initiated is as follows:

a. MORCOP - to own mortars - two minutes
- to guns - six to eight minutes;

b. BTY COP - two minutes;

c. BN COP - two minutes; and

d. Infantry or Tank Regimental, Battalion and Company Commander - not normal but could be done after consultation with Controller and an appropriate delay time has been agreed.

7. Once a RED attack fails RED artillery in support of the attacking force is reduced to a maximum of two gun battalions.

ANNEX F
TO DOR(J&L) RN 9702
MARCH 1997

Janus AUTOJAN Procedures

General Points

1. There has been discussion as to the relative utility and fidelity of AUTOJAN as a tool for operational research. The US Army developers of Janus have been less than fulsome in their support of the AUTOJAN function that they have developed. Because Janus AUTOJAN is simply replaying the human commands that are stored for each system, the actions that are observed on the screen during an AUTOJAN run do not necessarily relate to what a human would have done during that particular game, based on the information available. Therefore, AUTOJAN is not useful for scenarios where a great deal of minute-to-minute human judgement is required each time. There are however scenarios where AUTOJAN is very useful for allowing the same scenario to be replayed many times without tying up a group of players or where there is a need to make performance changes to the data and replay the run.

2. DOR(J&L) has gained a great deal of experience with AUTOJAN during IRON NOBLE. This utility made IRON NOBLE feasible. The paragraphs below reflect the lessons learned during IRON NOBLE and, if followed, will allow AUTOJAN to be used successfully in games where human intuition and guess work are not key tools in allowing commanders to decide what to do next.

Points to Bear in Mind

3. For offensive forces you may not want to use STOP nodes but rather use GO nodes and manually puck the icons to STOP as required. Players should also use Task Force orders as much as possible, particularly for movement and HOLD FIRE options. Systems which are killed during interactive play while on a stop node will never move beyond that point during subsequent AUTOJAN runs even if they remain alive, unless they receive a subsequent Task Force order. Similarly, if systems are in HOLD FIRE they will not be able to shoot during AUTOJAN. The use of Task Force commands should reduce these effects as much as possible.

4. Due to different events occurring (for example - systems dying in one run but not in the next) consider the following:

a. length of scenario
- keep as short as possible
- may have/want to AUTOJAN in phases and obtain results which are used in each succeeding phase; and

b. movement nodes
- record times in a first run and put in time nodes
- as above use Task Force commands but this may be a problem with only five Task Forces available on each work station
- consider having a database with zero Ph/Pk data. This would allow all the movement path and nodes to be put in and recorded. The limitation is that players have no idea necessarily when and where direct fire events happen which would force the commanders to make decisions.

5. Branch points cannot be used if a run is to be used for AUTOJANNING.

AUTOJAN Process

6. The AUTOJAN process only records the puck strokes from the mouse, therefore on J Screen II, the graph tablet column must be set to 1 for all stations used in the simulation. When one wishes to conduct an AUTOJAN run without players the **EXACT** same work station assignments must be used, J Screen II must be amended under graph tablets to -1 and the procedure as outlined in para 14 followed. The control station must be left with 1 in the graph tablet column.

7. One can AUTOJAN one side, but it requires a game to be played against that force that would be used in actual play. To AUTOJAN RED, one could either put BLUE into HOLD FIRE or give their weapons "zero lethality" in order that all the RED systems would be able to have all their puck strokes recorded. This would best be accomplished if RED

were in a defensive scenario. If done this way J Screen II would have to reflect 1 or 2 for the BLUE stations and -1 for the RED stations when conducting actual game play.

8. If one wishes to set up a scenario where RED is "canned" this can be done by setting up the RED scenario separately using time nodes, timed artillery shoots and then merging the RED and BLUE scenarios giving you a scenario that can be played using only BLUE players. This process takes some trial and error to achieve a realistic scenario but may serve the purpose of keeping the number of players to a minimum.

9. Ensure a PLAN SAVE is done before any player presses start.

10. Prior to start have players zoom out to largest screen and clear all text reports, CAC, etc from their screens.

11. After players press start:

    a. type RR as normal;

    b. say NO to PLAN SAVE; and

    c. do Not put in time for checkpoint - simply press return.

12. After simulation is running order players to turn on:

    a. clouds;

    b. grid;

    c. zoom to size of screen they wish; and

    d. bring up any CAC under control of RED and BLUE Commanders.

13. Generally the RWGT plays no less than three interactive games and then the best one would be chosen to AUTOJAN. Janus records all workstation puck actions into a

PPPUCK???00.DAT file (the ??? are the scenario number) which is found by clicking on the filing cabinet (see Appendix 3) and then projects, name of project and pps. This file is over-written each time an interactive run is made for each scenario. Therefore after each interactive run the PPPUCK file must be renamed with a file name such that the last two 00 are the run number. The AUTOJAN process only uses the PPPUCK???00.DAT file which means that you must copy the particular run's PPPUCK file back into the PPPUCK???00.DAT file before conducting an AUTOJAN run.

Conduct of the AUTOJAN Run

14. The following steps are required when conducting AUTOJANNING (Janus Version 6):

a. prepare a sheet to record AUTOJAN information (Appendix 1);

b. log into the account (user) where scenario(s) is/are located. Ensure the work stations on which the interactive simulation was conducted are logged on and the correct PPPUCK file is in the PPPUCK???00.DAT file (see paragraph 13);

c. start the simulation using JE (Appendix 2). Enter the scenario number and run number as requested. Ensure on J Screen II, that the graphic tablet column is set to -1 for all work stations, (except the control station(1)) before beginning simulation (Appendix 3);

d. if you wish to run a second (or more) simulation open a new Xterm window(on the control station) by clicking once on the TV symbol (Appendix 3) on the menu bar at the bottom of the screen. Then type 'menu' (small case), press 'enter' and the Janus Program Execution menu appears on the screen (Appendix 2). Start as many runs/simulations as you wish to run (1-3 is a reasonable number - the larger the scenario the less you should run);

e. if running more than one simulation, on the control station, reduce the simulation screens by using left (yellow) button on mouse and grabbing the

lower right corner of the Janus window so that the Admin menu remains visible and usable. These should then be moved to the right side of screen. Do this before starting any simulation (Appendix 4);

f. begin the first simulation as requested on the control station by clicking on JJ. Once the simulation appears on all work stations press start on the control station followed by RR. DO NOT conduct a PLAN SAVE or put in a checkpoint time (Appendix 5);

g. once the simulation has begun, on the control station, click on Admin with right (blue) button on mouse. The Admin menu appears on the control station. As we want to run these runs as fast as possible change the run speed from 1 to 5 by clicking on RS, type 5, hit ENTER(outside)(Appendix 4); and

h. the AUTOJAN runs do not stop automatically when the game was stopped and so the simulation must be stopped manually using the BLUE (right) button on the Admin menu and the clicking on EJ (Appendix 4). When you end the Janus run the Janus Program Execution menu appears on the screen and cannot be moved. You may have to move the simulation screen (if running more than one) in order to keep the Admin menu visible or you can simply close the Janus menu using the BLUE button on the Program Execution screen (Appendix 2).

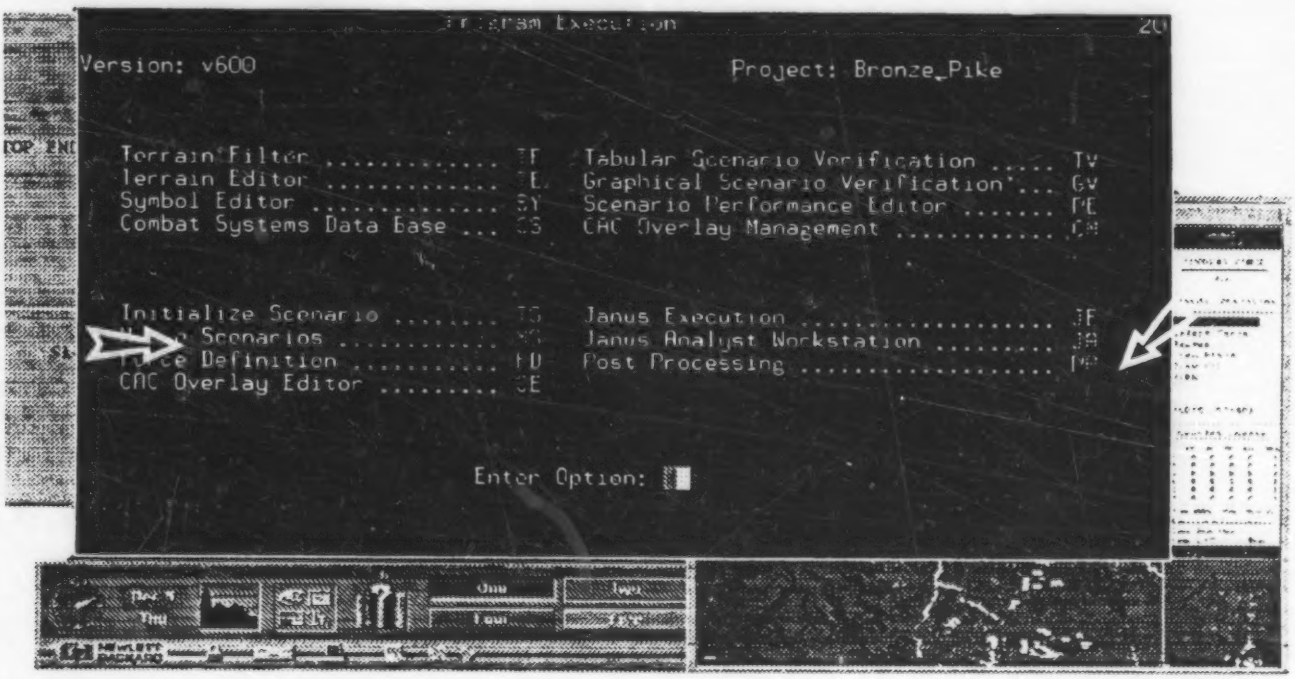
APPENDIX 1
TO ANNEX F
TO DOR(J&L) RN 9702
MARCH 1997

AUTOJAN Record

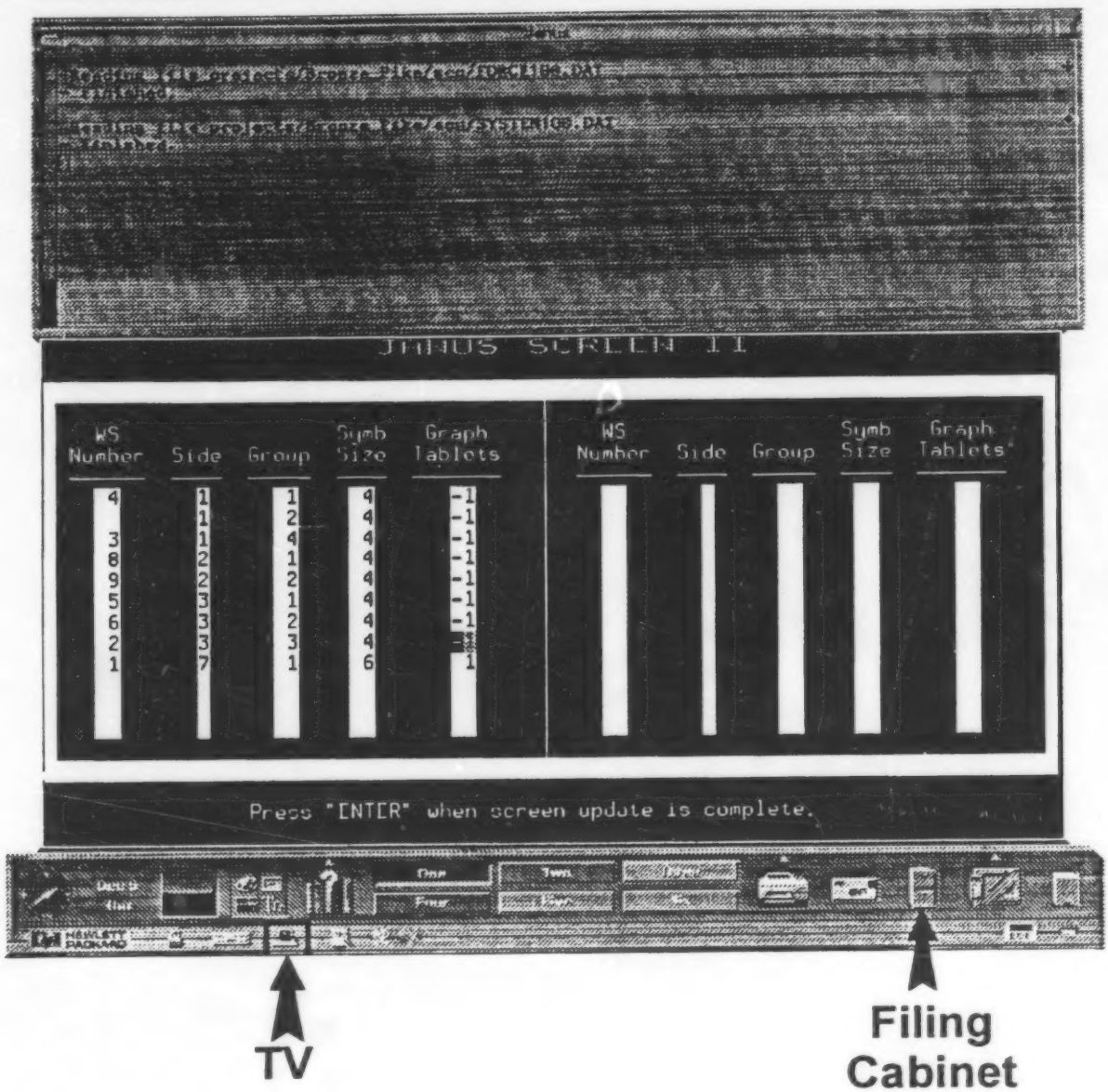
Scenario Number ___
Terrain Type ___
Base Run Number ___
Halts ___
Time ___

	AUTOJAN Runs	Date	Time
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			
11			
12			
13			
14			
15			
16			
17			
18			

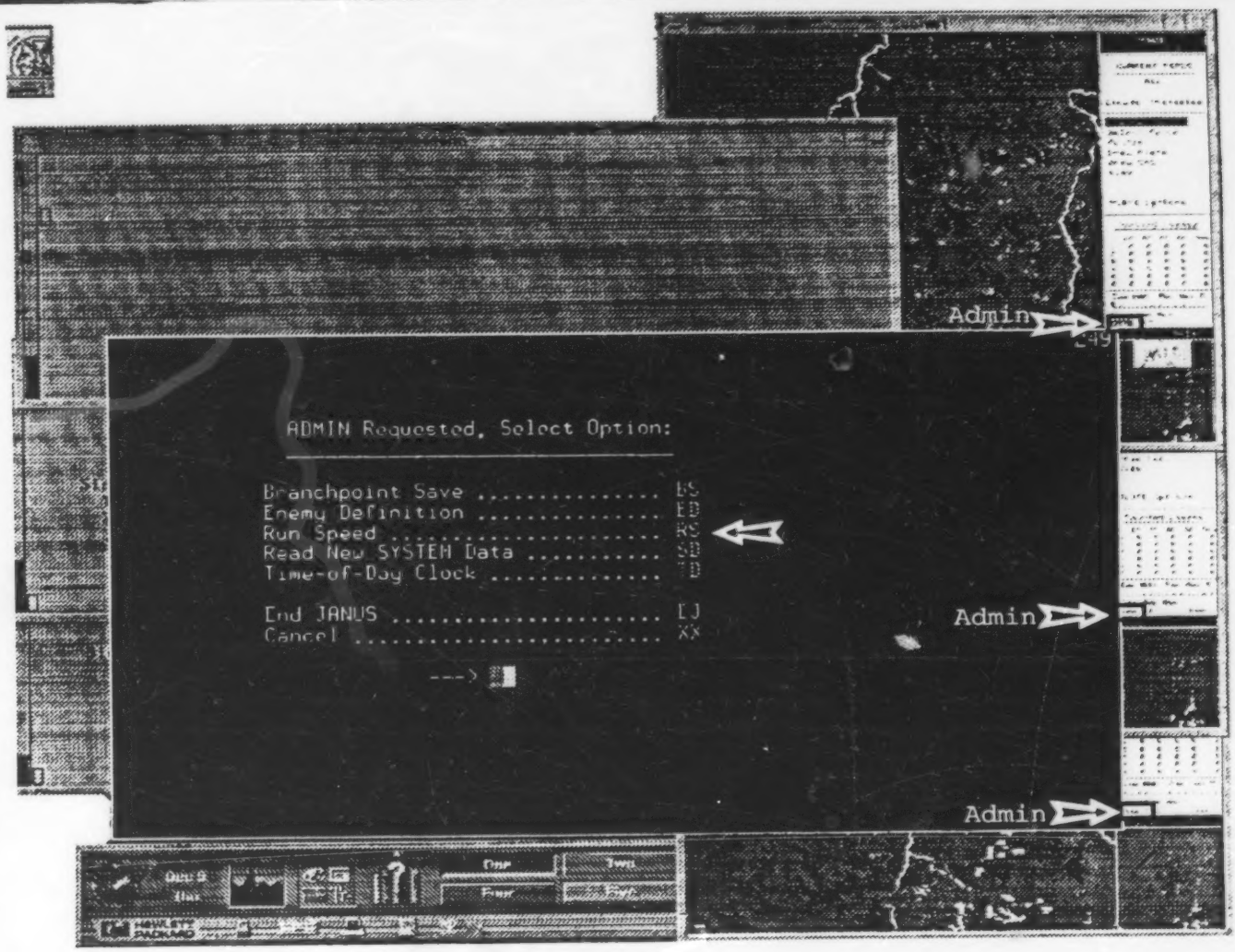
APPENDIX 2
TO ANNEX F
DOR(J&L) RN 9702
MARCH 1997



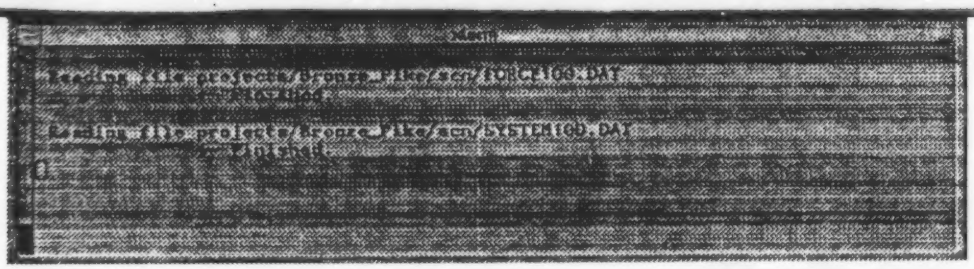
APPENDIX 3
TO ANNEX F
DOR(J&L) RN 9702
MARCH 1997

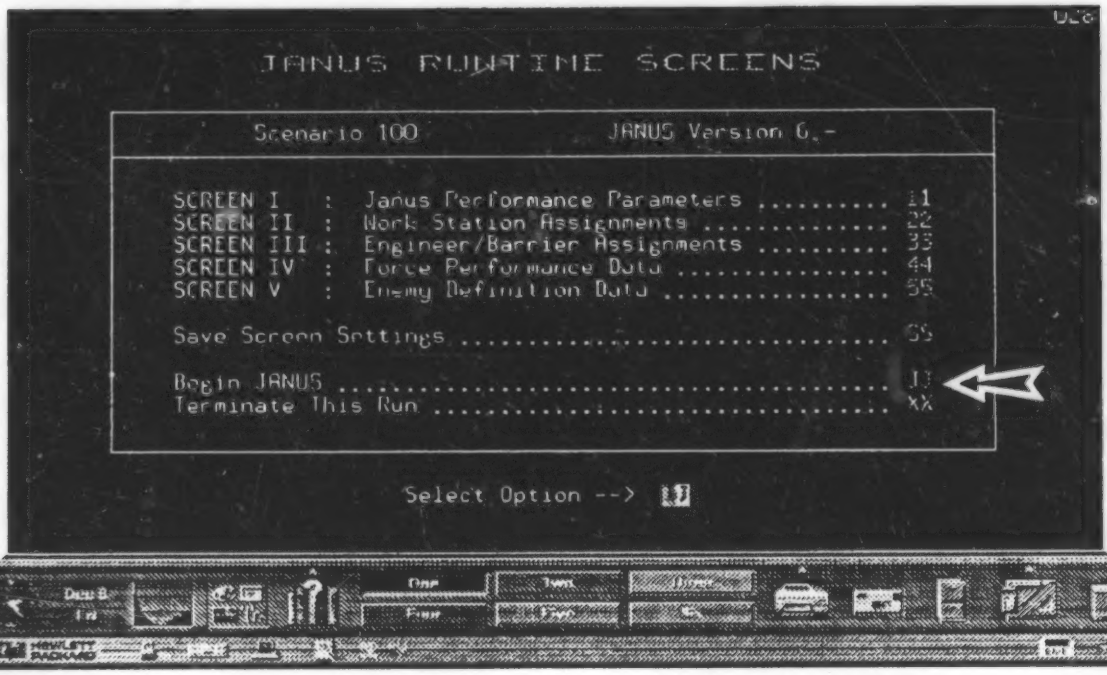


APPENDIX 4
TO ANNEX F
DOR(J&L) RN 9702
MARCH 1997



APPENDIX 5
TO ANNEX F
DOR(J&L) RN 9702
MARCH 1997




JANUS RUNTIME SCREENS
Scenario 100
JANUS Version 6.-
SCREEN I : Janus Performance Parameters 11
SCREEN II : Work Station Assignments 22
SCREEN III : Engineer/Barrier Assignments 33
SCREEN IV : Force Performance Data 44
SCREEN V : Enemy Definition Data 55
Save Screen Settings ..... GS
Begin JANUS ..... JJ
Terminate This Run XX
Select Option -->

ANNEX G
TO DOR(J&L) RN 9702
MARCH 1997

List of Abbreviations

ammo	ammunition
APC	Armoured Personnel Carrier
arty	artillery
ATGM	anti-tank guided missile
bde	brigade
BM21	Russian multiple rocket launcher
BM22	Russian multiple rocket launcher
bn	battalion
BN COP	battalion commander's command observation post (a system in the DOR(J&L) database)
bty	battery
BTY COP	battery command observation post (a system in the DOR(J&L) database)
CABG	Computer Assisted Board Game
comd	commander
conv	converge
CP	command post
DB	database
DLOR	Directorate of Land Operational Research (old directorate absorbed into DOR(J&L)
DOR(J&L)	Directorate of Operational Research (Joint and Land)
DS	direct support (a grouping for artillery)
FOO	Forward Observation Officer (Field Artillery)
fwd	forward
gp	group
GSR	General Support Reinforcing (a grouping for artillery)

GS	General Support (a grouping for artillery)
HE	high explosive
ICM	Improved Conventional Munitions
ldr	leader
LOS	Line of Sight
MFC	Mortar Fire Controller (Infantry)
mil	military
MLRS	Multiple Launch Rocket System (US Army multiple rocket launcher)
mm	millimetre
MOE	Measures of Effectiveness
Mor	mortar
MOR COP	mortar battery's command observation post (a system in the DOR(J&L) database)
OPI	Office of Primary Interest
ORBAT	Order Of Battle
par	parallel
Ph	Probability of Hit
Pk	Probability of Kill
POL	petroleum, oil and lubricant
recce	reconnaissance
rds	rounds
regt	regiment
RWGT	Research Wargames Team
Sci	scientist/scientific
US	United States

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This research note describes the majority of work required before and during a wargame conducted using the Computer Assisted Board Game (CABG) and/or JANUS simulation. Emphasis is placed on the duties of the Controller during the conduct of a research wargame. These comments are based on the experience gained during the IRON JOUST, IRON NOBLE and BRONZE PIKE wargames.

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War Game
JANUS
Computer Assisted Board Game